Concept of Operations for the Capability Maturity Model® Integration (CMMI℠)

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1. Introduction

The Capability Maturity Model Integration (CMMI) project is a collaborative effort to provide models for achieving product and process improvement. The primary focus of the project is to build tools to support improvement of processes used to develop and sustain systems and products. The output of the CMMI project is a suite of products, which provides an integrated approach across the enterprise for improving processes, while reducing the redundancy, complexity and cost resulting from the use of separate and multiple capability maturity models (CMMs).

The Concept of Operations (CONOPS) for the CMMI product suite includes the background and description of the CMMI, the process for using the CMMI, the scenarios for use, the process for maintenance and support and the approach for adding new disciplines. It is intended that the CONOPS not only describe the use of the proposed product suite, but also be used to obtain consensus from the developers, users and discipline owners on the required infrastructure to develop, implement, transition and sustain the CMMI product suite.

CMMs have been in use for various disciplines with the intent of providing a model of best practices for each of the intended disciplines. Users of these models have demonstrated that product and process improvements are achievable by institutionalizing processes consistent with the practices. In a complex environment, such as development where several of these disciplines are employed, the collective use of individual models has resulted in redundancies, additional complexity, increased costs and at times, discrepancies. To improve the efficiency of model use and increase the return on investment, the CMMI project was created to provide a single integrated set of models. Since not all organizations employ every discipline, the project also provides CMMI models for individual disciplines. Since not all processes apply equally to all organizations, the CMMI models are tailorable to an organization's mission and business objectives and criteria for tailoring are provided.

Initially, the CMMI project includes the disciplines of systems engineering, software engineering and Integrated Product and Process Development (IPPD). A framework is provided that generates products for each of these disciplines (IPPD is excluded, as it is included in the other disciplines as an option) as well as allowing for new disciplines that can be added in the future. A common set of process areas is provided that forms the core of an integrated capability model and applies to all disciplines. Although the initial intent of the CMMI project was to focus on processes used by developers of systems and products, the common process areas as defined will support other disciplines and should be considered for other use. To completely define the discipline, process areas unique to a discipline are also provided. Each of the process areas provides a model of best practices.

Recognizing the widespread use of CMMs throughout industry and the government, the CMMI project has included the objective of preserving the investments that have been made to improve processes. The intent

is to allow industry and the government to continue to improve by building on the investment they have already made in process improvement.

The effort to define and develop the CMMI is being sponsored by the Office of the Secretary of Defense/Acquisition and Technology (OSD (A&T)). The Industry sponsor is the Systems Engineering Committee of the National Defense Industrial Association (NDIA). The effort includes the design, implementation, transition and sustainment efforts. The CMMI project is a collaborative effort with participation by OSD, the Services, other government agencies, industry through the National Defense Industrial Association (NDIA) Systems Engineering Committee, and the Software Engineering Institute (SEI) of Carnegie Mellon University.

The management structure for the project includes a Steering Group made up of government, industry and the SEI and reporting to OSD (A&T). This Steering Group is responsible for overall direction, guidance and requirements provided to the Project Manager and Product Development Team. The responsibility for project management has been assigned to the Software Engineering Institute. A Product Development Team, consisting of representatives from industry, government and the Software Engineering Institute is developing the CMMI product suite. The initial review of the product suite is accomplished by Stakeholder/Reviewers, consisting of industry and government representatives. As new disciplines are added or the project moves through the sustainment phase, the makeup of the management structure may change as necessary.

2. CMMI Overview

The initial CMMI product suite includes a framework for generating CMMI products, and a set of CMMI products produced by the framework. The framework includes common elements and best features of the existing models as well as rules and methods for generating CMMI products. Users may select discipline specific elements of the CMMI product suite based on their business objectives and mission needs. The CMMI product suite will consist of:

- Framework
- Capability Maturity Model - Integration Models
- Training Products
- Assessment Products
- Glossary

2.1 Current CMMs

2.1.1 Definition/Description of a CMM

A capability maturity model delineates the characteristics of a mature, capable process. It identifies the practices that are basic to implementing effective processes as well as advanced practices. It also assigns to those practices associated maturity levels ranging from unrepeatable to a mature, well-managed process. Typically a path is recommended through the various practices for achieving higher levels of maturity and, therefore, improve an organization's processes.

2.1.2 History of CMMs

In response to a perceived crisis in software development related to escalating software cost and quality problems, the Department of Defense established the Software Engineering Institute (SEI) at Carnegie Mellon University in Pittsburgh, Pennsylvania in the early 1980s. SEI began the development of a process improvement model for software engineering in 1988. In August 1991 the first version of the Capability Maturity Model for Software (SW-CMM) was published by the SEI. Subsequently, the Enterprise Process Improvement Collaboration (EPIC), an industry and government collaborative effort, developed and published the Systems Engineering Capability Maturity Model (SE-CMM), and the International Council on

Systems Engineering (INCOSE) developed and published the Systems Engineering Capability Assessment Model (SECAM). Additional CMMs were also developed, including: the Software Acquisition CMM, the People CMM, and the Integrated Product Development CMM. Some business domains have also produced their own CMMs. Interest grew in combining the existing systems engineering CMMs into a single systems engineering model. The Electronic Industries Alliance (EIA) in concert with EPIC and INCOSE began an effort to consolidate the two Systems Engineering CMMs. The resulting systems engineering CMM was termed the Systems Engineering Capability Model (SECM) and was assigned the designation EIA/IS-731. Some organizations developed CMMs integrating several disciplines such as the Federal Aviation Administration's integrated Capability Maturity Model (FAA-iCMM). As the SW-CMM Version 2.0 was completing its review process, OSD directed that the CMMI project be undertaken as a collaborative industry, government and SEI effort and that the CMM Version 2.0 be cancelled as a stand-alone CMM and replaced by the software version of the CMMI product suite.

2.1.3 Use of CMMs in Defense and Commercial Sectors

Many organizations, both commercial and defense related, are now employing various CMMs in structuring their process improvement efforts and these models significantly influence investments in process improvement activities. The SW-CMM is among the most widely deployed of the CMMs across all business sectors, including commercial as well as defense business. The systems engineering models, while not as heavily deployed, are finding favor among mature organizations engaged in complex engineering activities. CMMs are routinely used for benchmarking of organization practice and for establishing process improvement plans. Although the Software Engineering Institute CMM efforts were originated by OSD initiatives, efforts to improve the CMMs or develop new ones must now consider both defense and commercial industry objectives.

2.2 Need for Transition to CMMI

2.2.1 Problems with Using Current CMMs

The SW-CMM is a "roadmap" that describes "evolutionary stages" consisting of key practices that guide organizations in improving their software capability. Also, several systems engineering maturity models support systems engineering process improvement. The EPIC SE-CMM and the INCOSE SECAM are alternative models, but as noted earlier, EPIC and INCOSE joined with the EIA to create EIA/IS-731, System Engineering Capability Model, to combine the two models. All of the systems engineering models share many of the same principles as the SW-CMM, but were written to address the needs of the systems engineering community. This had two consequences. First, the content of SW-CMM and the system engineering models overlap; for example, all deal with requirements, project management, process definition, etc. The different models provide somewhat different guidance in practices where they overlap, but the reason for the difference isn't always clear. Second, the systems engineering models are based on a different representation than the SW-CMM and similar to that of ISO/IEC 15504. This representation describes the entire "process area terrain" with less emphasis on exactly how an organization might mature through the terrain. Process areas span levels rather than being defined within a maturity level as in the SW-CMM. The systems engineering models employ what is termed a continuous representation; that is, capability levels for each process area are described independently of the others. The SW-CMM employs a staged representation; that is, process areas are grouped into collections and aligned with maturity levels. Finally, improvement efforts based on more than one unique CMM would likely result in sub-optimization, confusion, and potentially unnecessary expenditure of process improvement resources.

2.2.2 OSD Perspective on Need for Change

The OSD rationale for change was provided by the Office of the Secretary of Defense/Acquisition and Technology (OSD/A&T). With the various models for software engineering and systems engineering containing common processes, it was recognized that improvements made to one discipline could benefit the other. Also, assessments made for one discipline could be used for other discipline assessments thus eliminating redundant assessments.

2.2.3 Solution to Problem

Several events in combination made it evident that the time was right to begin developing an integrated CMM framework. These occurrences included the following:

- a first step had already been taken to merge the two existing systems engineering models (the SE-CMM and the SECAM into EIA/IS-731),
- a major update (Version 2.0) to the SW-CMM was nearing completion,
- the proliferation of CMMs was escalating,
- organizations operating in more than one discipline were becoming acutely aware of the problems of trying to improve integrated processes using separate, sometimes inconsistent CMMs, and
- sufficient experience in developing CMMs and abundant experience in using CMMs increased the likelihood that an integrated framework for a family of CMMs could be developed.

Thus, a requirement was formulated for a Capability Maturity Model-Integrated (CMMI) product suite. The suite would include a framework for generating CMMI products. The generated products would be based on CMMI models for specified disciplines and discipline combinations, training products, assessment materials, glossary terms, and tailoring requirements. The disciplines initially specified include Systems Engineering, Software Engineering, and Integrated Product and Process Development.

2.2.4 Value of CMMI

The CMMI includes a common set of process areas which form the core of an integrated capability model that integrates process improvement guidance for systems engineering, software engineering, and Integrated Product and Process Development (IPPD). The CMMI product suite provides an integrated approach to reducing the redundancy and complexity resulting from the use of separate, multiple capability maturity models (CMMs). The CMMI products should improve the efficiency of and the return on investment for process improvement. The resulting integrated capability models will be tailorable to an organization's mission and business objectives.

2.3 Guiding Principles in Developing the CMMI

2.3.1 CMMI Organization

With industry being impacted by the use of multiple CMMs, it was decided that industry would play a key role in the development of the CMMI. Industry confirmed its willingness to participate in CMMI development through the NDIA Systems Engineering Committee. With industry willingness, the CMMI project was established as a collaborative development effort with participation by OSD, the services, other government organizations, industry and the Software Engineering Institute. Industry participation included only those who are candidate model users, i.e., bona fide developers of hardware and/or software systems.

Overall guidance is provided by a Steering Group composed of representatives from OSD, Air Force, Army, Navy, other government, SEI and industry. The Steering Group operates under a charter that defines its purpose, responsibilities, operation and membership. Its mission is to direct and oversee the development of the CMMI product suite. This includes reviewing CMMI products for review and public release. The project management of the CMMI project is accomplished by a representative of the Software Engineering Institute, who reports directly to the Steering Group. The Software Engineering Institute was selected because of its expertise in developing capability maturity models. The project is managed in a collaborative manner with subject matter experts, initially in software, systems engineering and Integrated Product and Process Development (IPPD). These experts form the Product Development Team that is responsible for developing and producing the CMMI products. The Project Manager leads the Product Development Team. The Product Development Team members are full and part-time representatives from industry, government and the SEI. Stakeholder/Reviewers are chartered to review, comment and make recommendations on the CMMI products developed. They also consist of representatives from industry, government and the SEI. The Stakeholder/Reviewers are limited to one per organization, but are chartered to consolidate comments

from across their organizations. The intent is to broaden the review and acceptance of the CMMI products throughout industry and the government. A public review follows resolution of issues associated with the Stakeholder/Review process.

2.3.2 Use of Systems Engineering Process

The CMMI products are developed using a systems engineering process. To direct the product development, requirements have been derived and are contained in the CMMI A-Specification. This specification defines the scope, functional requirements and verification requirements for the CMMI product suite. The intent is to provide industry and government a set of integrated products to support process and product improvement. This is accomplished by starting with existing, widely known models, that are discipline specific, and integrating them by specifying common process areas. The CMMI product suite contains a framework that includes the common elements and best features of current models and the rules and methods for generating CMMI products. The common elements, together with discipline specific elements, allows the user to generate integrated capability models or discipline specific capability models. Products for training and assessment are also developed as part of the CMMI product suite.

2.3.3 Preservation of Industry Investment

It is recognized that industry has already made a considerable investment using the existing capability models. This investment has allowed for considerable improvement in the disciplines of software and systems engineering. Although the benefits have included improved processes, DoD contractors that cross disciplines have incurred additional costs and redundancies in complying with independent models. As a result of the investment made to achieve these required maturity levels and the recognition that has come with their achievement, the CMMI product suite is developed to preserve these investments.

Individual as well as integrated Systems Engineering and Software Engineering models, with and without IPPD, are specified for use in the A-Specification. In addition, applicable ISO documents are cited for reference, consistency and compatibility. To achieve the objective for continued process improvement, the CMMI product suite incorporates improvements to the existing models, provided the improvements were observed, documented and judged to be effective. This is similar to the process that was already in place for release of Version 2.0 of the SW-CMM.

In keeping with preserving industry investment, both staged and continuous representations of the models are included in the product suite. This will allow companies to continue using the model representation with which they are familiar. Those companies that know they want to focus their improvements in certain areas can use the continuous representation. The staged representation can continue to be used by those already using the staged representation and are comfortable with it.

2.3.4 ISO Efforts

As the CMMI product suite was being developed, compatibility was maintained with emerging International Standards Organization (ISO) efforts. The CMMI A-Specification contains the requirement that the CMMI product suite be consistent and compatible with ISO/IEC 15504. Many individuals involved in the CMMI effort are also involved in related ISO/IEC efforts as members of the JTC1/SC7 US TAG.

2.3.5 Tailoring

The CMMI is designed to cover processes across the full development cycle and is designed to be broad enough to cover a wide range of systems and products. It is recognized that not all process areas or practices within a process area may apply to a specific organization. Therefore, tailoring criteria are provided that allows CMMI to be used with only the processes or activities that apply.

2.3.6 Commercial Industry Involvement

While the Software Engineering Institute has been developing CMMs under OSD funding, commercial industry has been a substantial user of CMMs and has been active during sustainment. Therefore, the CMMI product suite is being developed with input from commercial industry and commercial industry has been included on the Product Development Team, in the Stakeholder/Reviewers and on the Steering Group. Their input is also valuable to ensure that commercial products remain viable for DoD applications. 2.4 Description of CMMI

2.4.1 Framework

The CMMI Framework consists of a data repository and defined processes for inserting text into the repository, for managing the repository, and for generating a capability maturity model along with the supporting assessment and training materials. The repository contains common components that are essential to all models; shared components that are shared by several models, but not all models; unique components that are discipline-specific; and rules for model construction. The output from the Framework will include the models, training materials, and an assessment method for specified disciplines and discipline combinations. The Framework provides the mechanism needed to integrate additional disciplines into the CMMI product suite in the future.

2.4.2 Models

The initial model set of the CMMI product suite contains the following:

- Software Engineering (CMMI-SW)
- Systems Engineering (CMMI-SE)
- Systems Engineering + Software Engineering (CMMI-SE/SW)
- Systems Engineering + Software Engineering with Integrated Product & Process Development (CMMI-SE/SW/IPPD)

An organization would choose the particular model and representation that meet the needs of their particular requirements, business disciplines, and roles. Each model set can be created in either staged or continuous representations. Refer to the CMMI A-Specification, section "2.4 Definitions" for the formal definitions of "staged representation" and "continuous representation" used throughout the CMMI project. A staged representation provides for process improvement by performing specific practices within process areas assigned to various maturity levels. Processes are improved as higher levels of maturity are achieved. The continuous representation with equivalent staging provides for process improvement by achieving generic goals assigned to various capability levels. This recommended staging for the continuous model representation is intended to be equivalent relative to the staged model representation. However, it is not necessary that the equivalent staging be implemented, but that the set of generic goals are satisfied. Organizations may alter the staging to match business objectives.

2.4.3 Training

The CMMI product suite includes training materials that support the application of the CMMI products. Training materials will include introductory training for the various models that are generated from the CMMI Framework and for both staged and continuous model representations. Additionally, training materials have been produced for lead assessor training as well as assessment team training.

2.4.4 Assessment Methodology

The CMMI product suite includes assessment methods that provide data collection methods and tools for both staged and continuous model representations. The product suite also includes materials for an assessment framework that supports assessment planning. The assessment methodology specifies a tailoring process with appropriate requirements for the tailoring. Finally, the assessment methodology specifies compliance criteria for each model.

3. Concept for Operational Use of the CMMI

3.1 CMMI Users

The CMMI product suite was developed specifically for those users who are system and product developers and want to improve their processes and products. Tools and models are provided that enable users to assess where they are, identify goals for future improvements, follow models of best practices to achieve those goals and use CMMI products to conduct training, perform assessments and do tailoring. Recognizing that development usually can be complex and require different players, the users of the CMMI product suite can include:

- Enterprise executives
- Product decision makers
- Product developers
- Product evaluators
- Process owners
- Process champions
- Process improvement sponsors
- Process improvement groups, e.g. SEPGs
- Process developers
- Process implementers
- Process improvement consultants
- Trainers
- Assessors
- Discipline specific professional organizations

Each of these users has a role in the development of a system or product or in the processes that define a system, product or service. Collectively each has a role in determining what the processes will be in product development. The CMMI product suite will provide the tools to make decisions on processes, develop processes or support the process developers.

3.2 Application of Integrated Disciplines

The CMMI project addresses the need to provide an enterprise solution to process improvement by providing a model that integrates process areas across disciplines. This enables efficiencies by breaking down stovepipes, where integrated processes are feasible. In today's environment of Integrated Product Teams (IPT), integrated processes also enable cross-functional teams to work together using common processes and common terminology.

3.3 Use of Framework

The CMMI framework will provide a set of choices that determine the specific CMMI products to be provided. These choices include:

- Selection of the model
- Selection of the model representation
- Selection of the assessment method

Once a CMMI user has received the requested products, they may be tailored to meet specific organizational goals and objectives.

3.3.1 Selection of Staged or Continuous Representation

The CMMI models are generated in either the "staged representation" or the "continuous representation with equivalent staging." For the selected discipline(s), all the same concepts, process areas, practices, and guidance are included in each representation. Both representations provide guidance regarding three things:

- What process areas and specific practices to perform
- What generic practices to perform to enhance process capability
- What process areas together contribute to each step of organizational process maturity

The A-Specification requires assessment findings and ratings be consistent regardless of the model representation. The difference between the representations is purely structural, with regard to the way the model content is packaged. Thus, choice of representation is simply a matter of user style and preference. The structural differences are:

- Each process area in a "staged representation" is a complete package that contains both its specific practices and the generic practices. The generic practices are repeated and included with each process area.

- Each process area in a "continuous with equivalent staging representation," contains its specific practices only, while generic practices are presented and packaged separately. Generic practices are not repeated for each process area, since the same generic practices are always applied.

3.3.2 Selection of a Model

The selection of a model is dependent upon the particular discipline or disciplines relevant to the organization within the scope of applicability to the organization. The relevance of the disciplines depends upon the roles being performed by the organization. If an organization is concerned exclusively with software engineering or exclusively with systems engineering activities, then the appropriate models would be the CMMI-SW or CMMI-SE, respectively. However, if an organization were concerned with both systems engineering and software engineering, then using a combined CMMI-SE/SW model would be more appropriate, since it would encourage improvement of integrated practices, reducing the repetition and administrative burden that is common to maintaining separated disciplines. Finally, if an organization were employing Integrated Product and Process Development (IPPD) in their practices, then using a model that includes IPPD would be appropriate. 3.3.3 Selection of an Assessment Method

Associated with all CMMI models is an assessment methodology that is used to support continuous process improvement. The methodology itself is not discipline specific, but supporting assessment aids (such as questionnaires, templates, etc.) are specific to the model selected.

The CMMI product suite contains the assessment methodology for a full, comprehensive assessment. For other types of assessments, such as quick look, first or reassessment, the full assessment should be useful in constructing other assessment methods.

3.3.4 Tailoring

Tailoring is the selective use of the content of the products generated by the CMMI framework. This selective tailoring is done by the organization applying the CMMI products. Tailoring may be performed several ways and for a variety of reasons. Tailoring may be done by restricting the application of a CMMI model to specified process areas. This may be appropriate if certain process areas are not appropriate to the organization's role or business approach. For example, if an organization integrates subcontractor labor into its own processes and has no actual suppliers, then the Supplier Agreement Management process area would not be essential to the organization's practice and could be tailored out. Similarly, some practices within a process area might not be relevant to a particular systems engineering role and could, therefore, be excluded. Finally, the recommended process improvement order for implementing practices may be altered

to better meet business objectives. However, CMMI models are only models and thus are abstractions of reality. Models must be chosen and tailored according to organizational need, aligned with organizational goals and objectives, and used with judgement.

3.4 Use of Models

CMMI models are used for several purposes. They:

- Guide process improvement efforts and help organizations establish and achieve improvement goals.
- Provide a common language for cross-organizational communication and benchmarking.
- Provide an integrating, organizing framework for organizational endeavors.
- Help an organization understand what specific practices to perform, how to improve its capability in performing those practices, and what process areas to focus on next.

3.5 Use of Assessment Methods

Assessments are an integral part of an organization's process improvement program. An assessment measures process status against a reference model, motivates process improvement, and provides a basis for action planning. The initial CMMI Product Suite contains the methodology for a full assessment.

The full assessment is formal and robust and based on analysis of extensive data gathered through several sources, including questionnaires, interviews, and documents. It is intended to identify strengths and weaknesses, and derive capability and/or maturity ratings, which can then be used to improve an organization's processes.

4. Migration to CMMI Models

Organizations that are currently using one or more CMMs should not suffer any improvement setbacks by migrating to CMMI. Rather they will gain the benefits of working with the guidance of an updated integrated reference model. Since CMM concepts have not changed, training on CMMI models and assessments will be analogous to current training with courses that have specific focus on structural changes in model representation, as well as new practices and process areas. An organization already using a CMM may be inclined to choose the representation they are most used to. For organizations that are at a maturity level and the next maturity level represents a logical evolution of its practices, then the staged representation might be preferable. For organizations that need to improve specific practices or process areas to meet its business needs, the continuous representation may be more adaptable. The decision is a matter of organizational preference, and for consistency, the continuous representation has a staging equivalent to the staged representation.

5. Concept for Maintenance and Support

Provisions exist to maintain and evolve the CMMI product suite after development and initial release. The intent is to ensure that it is widely adapted and institutionalized, accepted nationally and internationally, kept up to date by continuous monitoring with the user community, and new disciplines added as necessary to further enhance enterprise wide process improvement.

To accomplish the maintenance and support function, a CMMI Custodian has been selected to:

- implement the maintenance and evolution of the CMMI product suite provide public availability of the product suite
- provide widely available, high quality training and assessment programs
- administer quality control of the CMMI product suite usage
- act as the center for CMMI communications

- support relevant national and international standardization activities
- provide analysis and feedback on CMMI product suite use, impact and value
- plan and implement strategies as approved to fund and sustain the CMMI product suite

The Custodian will work under a charter developed to define its roles and responsibilities. The Software Engineering Institute of Carnegie Mellon University is designated as the Custodian, and will be supported by industry and government discipline experts. Further information is available in the CMMI Custodian Plan.

6. Concept for Adding New Disciplines to CMMI

The CMMI product suite has been developed to provide a framework that contains process areas, common across disciplines, and is structured to readily add new disciplines in the future. Products for new disciplines will require a discipline sponsor or recognized authority for that discipline who represents the knowledge base and desires of the community associated with the discipline. This discipline sponsor or recognized authority will be responsible for bringing forward the product need to the OSD or NDIA sponsors or to the Steering Group. Assuming the need can be established and it fits within the charter of the CMMI project, effort will be initiated to incorporate the new discipline into the CMMI product suite. The steps for integrating a new discipline are in the Appendix.

Appendix

Steps for Integrating a New Discipline to CMMI

The following steps are provided for integrating new disciplines into the CMMI product suite. These steps are also summarized in the process diagram attached.

- The discipline sponsor or discipline authority requests to the CMMI OSD and NDIA sponsors that a new discipline should be integrated into the CMMI product suite.
- The Steering Group accepts the task from the sponsors to evaluate and determine if the new discipline should be integrated into the CMMI product suite. The new discipline sponsor briefs the Steering Group on the need.
- The Custodian and its supporting teams, including new discipline experts, assess the feasibility and impact of integrating the new discipline and reports to the Steering Group.
- The Steering Group makes a recommendation to the sponsors based on the Custodian's assessment.
- The Sponsor makes a decision to integrate the new discipline or to reject the request.
- A modification to the CMMI A-Specification for the new discipline is prepared by the Steering Group.
- A plan is prepared by the Custodian and the Discipline Expert and Core Process Maintenance Teams containing the tasks to be performed to add the discipline, a detail schedule by task, proposed budget, identification of funding sources, identification of personnel resources and organization, and identification of unique process areas.
- The plan and modified A-Specification are forwarded to the Steering Group for approval.
- The Steering Group reviews and coordinates with the discipline sponsor to approve its inclusion.
- The discipline sponsor provides the funding, and/or resources, or assists the Custodian with a business case if it is determined that the requested new discipline has broad user appeal and/or application. The Steering Group determines the author team to produce new elements unique to the new discipline and to modify common areas as appropriate.
- The discipline sponsor, Custodian, Core Process Maintenance Team and Discipline Expert Team creates a B-Specification to define the requirements for adding the new discipline and based on the modified A-Specification.
- The new elements will be developed by the Custodian, Core Process Maintenance Team and Discipline Expert Team in accordance with the A-Specification, modified B-Specification(s) and CMMI principles. The CMMI product suite will provide templates and guidance to assist this

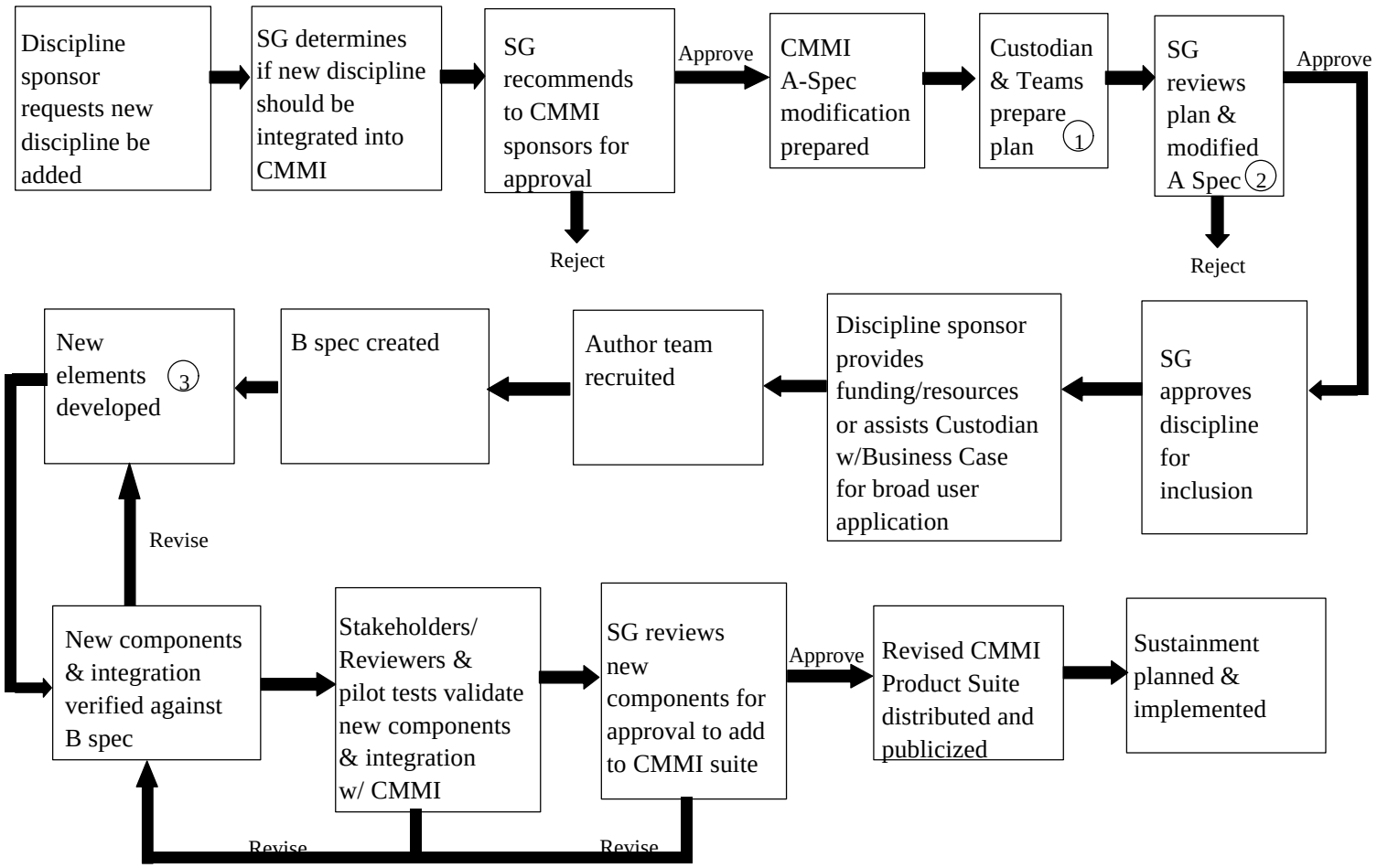
effort. Amplification to the common elements and new Process areas will be developed. This development will also include:

- Discipline specific assessment methods
- Discipline specific training materials
- Discipline specific terminology for the Glossary

- The new components and integration with CMMI will be verified against the A-Specification and the B-Specification(s).
- The new components and integration with CMMI will be validated sequentially by Stakeholder/Reviewers and pilot tests, as well as opportunity for public comment.
- After validation of the new components, approval is obtained from the Steering Group to add the new discipline into the CMMI product suite.
- Notification and distribution is made by the Custodian of the revised CMMI product suite.
- Efforts are planned and implemented by the Custodian for sustainment of the new discipline as integrated into the CMMI product suite.

The details of the plan, approval for inclusion in the CMMI product suite and the work products are provided in the footnotes to the attached process flow. The process and details are provided to ensure that as new disciplines are integrated, the concept of maintaining common process areas and an integrated product suite are maintained. Thus, the benefits of CMMI can be preserved for all disciplines included.

CMMI NEW DISCIPLINE PROCESS



DETAILS OF PLAN, APPROVAL AND WORK PRODUCTS

① Plan should include:
Tasks to add new discipline
Detailed schedule by task
Proposed budget
Identification of funding sources
Identification of resources
(personnel & organization)
Identification of unique PAs

② Approval based on specific criteria:

Qualifications for inclusion?
- Fits scope of CMMI framework
- Broad user constituency
(government & industry)
- Potential for strong sponsor
- Overlap with common PAs
- Number of unique PAs

Considerations for inclusion?
- Ability of new discipline sponsor to commit resources
- Availability of funds
- Availability of expertise
- Maintenance cost
- Applicability to DoD
- Technical feasibility

③ Products should include:
Changes to A Spec
Discipline specific B Spec
Discipline specific PAs
Discipline specific changes to common PAs
Discipline specific changes to glossary
Discipline specific changes to training material
Discipline specific changes to assessment materia